

CHLOROPRENE

Chloroprene is a federal hazardous air pollutant and was identified as a toxic air contaminant in April 1993 under AB 2728.

CAS Registry Number: 126-99-8



Molecular Formula: $\text{C}_4\text{H}_5\text{Cl}$

Chloroprene is a colorless liquid with a pungent, ethereal odor. It is soluble in alcohol and diethyl ether; slightly soluble in water; and miscible with ether, acetone, and benzene. It is also highly flammable (Sax, 1987).

Physical Properties of Chloroprene

Synonyms: 2-chloro-1,3-butadiene; 2-chlorobutadiene-1,3; chlorobutadiene; beta-chloroprene; neoprene

Molecular Weight:	88.54
Boiling Point:	59.4 °C
Melting Point:	-130 °C
Flash Point:	-20 °C (-4 °F)
Vapor Density:	3.0 (air = 1)
Density/Specific Gravity:	0.9583 at 20/4 °C (water = 1)
Vapor Pressure:	174 mm Hg at 20 °C
Log Octanol/Water Partition Coefficient:	2.03
Conversion Factor:	1 ppm = 3.62 mg/m ³

(Howard, 1990; HSDB, 1991; Sax, 1987; U.S. EPA, 1994a)

SOURCES AND EMISSIONS

A. Sources

Chloroprene is used in the production of polychloroprene elastomers. It is used in hoses, conveyor belts, wire insulation, and for many industrial rubber products. It is also a component in adhesives that are intended for use in food packaging (HSDB, 1991).

The primary stationary sources that have reported emissions of chloroprene in California are plastics materials and synthetics manufacturing, aircraft and parts manufacturing, and national security (ARB, 1997b).

B. Emissions

The total emissions of chloroprene from stationary sources in California are estimated to be at least 290 pounds per year, based on data reported under the Air Toxics “Hot Spots” Program (AB 2588) (ARB, 1997b).

C. Natural Occurrence

No information about the natural occurrence of chloroprene was found in the readily-available literature.

AMBIENT CONCENTRATIONS

No Air Resources Board data exist for ambient measurements of chloroprene. However, the United States Environmental Protection Agency (U.S. EPA) has compiled ambient air data on chloroprene from several urban locations throughout the United States. From this data, the U.S. EPA calculated an overall mean concentration during 1990 of 0.29 micrograms per cubic meter ($\mu\text{g}/\text{m}^3$) or 0.08 parts per billion (U.S. EPA, 1993a).

INDOOR SOURCES AND CONCENTRATIONS

No information about the indoor sources and concentrations of chloroprene was found in the readily-available literature.

ATMOSPHERIC PERSISTENCE

Chloroprene is expected to exist almost entirely in the vapor phase in the atmosphere. It is expected to react with hydroxyl (OH) radicals, NO_3 radicals, and O_3 , with the OH radical reaction probably dominating as a tropospheric loss process. However, no reaction rate, atmospheric half-life, or lifetime data are available (Atkinson, 1995).

AB 2588 RISK ASSESSMENT INFORMATION

The Office of Environmental Health Hazard Assessment reviews risk assessments submitted under the Air Toxics “Hot Spots” Program. Of the risk assessments reviewed as of December 1996, for non-cancer health effects, chloroprene does not contribute to a total chronic or acute hazard index greater than 1 in any of the risk assessments (OEHHA, 1996b).

HEALTH EFFECTS

Probable routes of human exposure to chloroprene are inhalation and dermal contact (HSDB, 1991; U.S. EPA, 1994a).

Non-Cancer: Chloroprene vapors are irritating to the eyes and respiratory tract (Sittig, 1991). It is a central nervous system depressant at high levels. The liver and kidney are the major target organs. Long-term exposure to chloroprene vapor may cause liver function abnormalities, cardiovascular system disorders, and immune system depression.

A chronic non-cancer Reference Exposure Level (REL) of $1.0 \mu\text{g}/\text{m}^3$ is listed for chloroprene in the California Air Pollution Control Officers Association Air Toxics “Hot Spots” Program, Revised 1992 Risk Assessment Guidelines. The toxicological endpoints considered for this chronic toxicity are the central and peripheral nervous systems (CAPCOA, 1993). The U.S. EPA is currently reviewing the Reference Concentration (RfC) for chloroprene and has not established an oral Reference Dose (RfD) (U.S. EPA, 1994a).

Limited evidence is available for adverse reproductive effects in humans and test animals. Reproductive effects including a reduced number of spermatogonia, a decline in sperm motility, an increased number of dead sperm, and a degeneration of the testes have been observed in male rats exposed by inhalation or dermal contact (U.S. EPA, 1994a).

Cancer: The National Toxicology Program is testing chloroprene with inhalation bioassays in both rats and mice. The U.S. EPA has classified chloroprene in Group D: Not classifiable as to human carcinogenicity due to inadequate data (U.S. EPA, 1994a). The International Agency for Research on Cancer has classified chloroprene in Group 3: Not classifiable as a carcinogen (IARC, 1987a).

